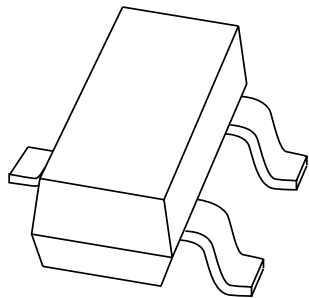


DATA SHEET



PLVA600A series Low-voltage avalanche regulator diodes

Product specification
Supersedes data of 1996 Apr 26

1999 May 25

Low-voltage avalanche regulator diodes

PLVA600A series

FEATURES

- Very low dynamic impedance at low currents: approximately $\frac{1}{20}$ of conventional series
- Hard breakdown knee
- Low noise: approximately $\frac{1}{10}$ of conventional series
- Total power dissipation: max. 250 mW
- Small tolerances of V_Z
- Working voltage range: nom. 5.0 to 6.8 V
- Non-repetitive peak reverse power dissipation: max. 30 W.

APPLICATIONS

- Low current, low power, low noise applications
- CMOS RAM back-up circuits
- Voltage stabilizers
- Voltage limiters
- Smoke detector relays.

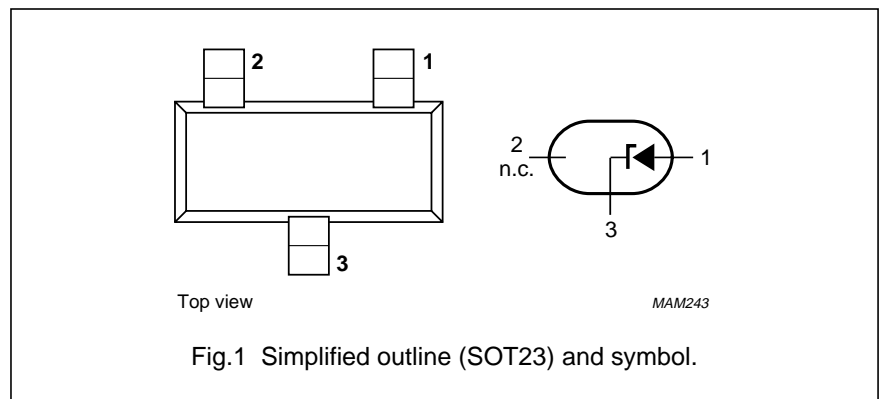
DESCRIPTION

High performance voltage regulator diodes in small SOT23 plastic SMD packages.

The series consists of PLVA650A to PLVA668A.

PINNING

| PIN | DESCRIPTION |
|-----|---------------|
| 1 | anode |
| 2 | not connected |
| 3 | cathode |



MARKING

| TYPE NUMBER | MARKING CODE ⁽¹⁾ |
|-------------|-----------------------------|
| PLVA650A | *9A |
| PLVA653A | *9B |
| PLVA656A | *9C |
| PLVA659A | *9D |
| PLVA662A | *9E |
| PLVA665A | *9F |
| PLVA668A | *9G |

Note

1. * = p: Made in Hong Kong.
* = t: Made in Malaysia.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|-----------|---|---|------|------|------------|
| I_F | continuous forward current | | – | 250 | mA |
| I_{ZRM} | repetitive peak working current | $t_p = 100 \mu s; \delta = 10\%$ | | 250 | mA |
| P_{ZSM} | non-repetitive peak reverse power dissipation | $t_p = 100 \mu s; T_j = 150 \text{ }^\circ C$ | | 30 | W |
| P_{tot} | total power dissipation | $T_{amb} = 25 \text{ }^\circ C$; note 1 | – | 250 | mW |
| T_{stg} | storage temperature | | –65 | +150 | $^\circ C$ |
| T_j | junction temperature | | – | 150 | $^\circ C$ |

Note

1. Device mounted on an FR4 printed circuit-board.

Low-voltage avalanche regulator diodes

PLVA600A series

ELECTRICAL CHARACTERISTICS $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|--------|-------------------------|---|------|------|-------|----------|
| V_F | forward voltage | $I_F = 10\text{ mA}$ | – | – | 0.9 | V |
| V_Z | working voltage | $I_Z = 250\text{ }\mu\text{A}$ | | | | |
| | PLVA650A | | 4.80 | 5.00 | 5.20 | V |
| | PLVA653A | | 5.10 | 5.30 | 5.50 | V |
| | PLVA656A | | 5.40 | 5.60 | 5.80 | V |
| | PLVA659A | | 5.70 | 5.90 | 6.10 | V |
| | PLVA662A | | 6.00 | 6.20 | 6.40 | V |
| | PLVA665A | | 6.30 | 6.50 | 6.70 | V |
| | PLVA668A | | 6.60 | 6.80 | 7.00 | V |
| V_Z | working voltage | $I_Z = 10\text{ }\mu\text{A}$ | | | | |
| | PLVA650A | | – | 4.30 | – | V |
| | PLVA653A | | – | 5.20 | – | V |
| | PLVA656A | | – | 5.51 | – | V |
| | PLVA659A | | – | 5.85 | – | V |
| | PLVA662A | | – | 6.19 | – | V |
| | PLVA665A | | – | 6.49 | – | V |
| | PLVA668A | | – | 6.80 | – | V |
| R_Z | dynamic resistance | 1 kHz superimposed; I_{ZAC} is 10% of I_{ZDC} ; $I_Z = 250\text{ }\mu\text{A}$ | | | | |
| | PLVA650A | | – | – | 700 | Ω |
| | PLVA653A | | – | – | 250 | Ω |
| | PLVA656A to PLVA668A | | – | – | 100 | Ω |
| S_Z | temperature coefficient | $I_Z = 250\text{ }\mu\text{A}$ | | | | |
| | PLVA650A | | – | 0.20 | – | mV/K |
| | PLVA653A | | – | 1.60 | – | mV/K |
| | PLVA656A | | – | 1.90 | – | mV/K |
| | PLVA659A | | – | 2.40 | – | mV/K |
| | PLVA662A | | – | 2.65 | – | mV/K |
| | PLVA665A | | – | 2.90 | – | mV/K |
| | PLVA668A | | – | 3.40 | – | mV/K |
| I_R | reverse current | $V_R = 80\% V_Z$ nominal | | | | |
| | PLVA650A | | – | – | 20000 | nA |
| | PLVA653A | | – | – | 5000 | nA |
| | PLVA656A | | – | – | 1000 | nA |
| | PLVA659A | | – | – | 500 | nA |
| | PLVA662A | | – | – | 100 | nA |
| | PLVA665A | | – | – | 50 | nA |
| | PLVA668A | | – | – | 10 | nA |

Low-voltage avalanche regulator diodes

PLVA600A series

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|--------------|-----------------------|---|------|-------|------|--|
| I_R | reverse current | $V_R = 50\% V_Z$ nominal | | | | |
| | PLVA650A | | – | 34 | – | nA |
| | PLVA653A | | – | 22 | – | nA |
| | PLVA656A | | – | 1.1 | – | nA |
| | PLVA659A | | – | 0.9 | – | nA |
| | PLVA662A | | – | 0.9 | – | nA |
| | PLVA665A | | – | 0.9 | – | nA |
| | PLVA668A | | – | 0.8 | – | nA |
| I_R | reverse current | $V_R = 90\% V_Z$ nominal | | | | |
| | PLVA650A | | – | 21 | – | μ A |
| | PLVA653A | | – | 3.5 | – | μ A |
| | PLVA656A | | – | 1.3 | – | μ A |
| | PLVA659A | | – | 1.0 | – | μ A |
| | PLVA662A | | – | 0.05 | – | μ A |
| | PLVA665A | | – | 0.04 | – | μ A |
| | PLVA668A | | – | 0.006 | – | μ A |
| ΔV_Z | line regulation | | | | | |
| | PLVA659A to PLVA668A | $I_{LO} = 10 \mu\text{A}; I_{Hi} = 1 \text{ mA}$ | – | – | 0.1 | V |
| | PLVA656A | $I_{LO} = 50 \mu\text{A}; I_{Hi} = 1 \text{ mA}$ | – | – | 0.1 | V |
| | PLVA650A | $I_{LO} = 100 \mu\text{A}; I_{Hi} = 1 \text{ mA}$ | – | – | 0.4 | V |
| | PLVA653A | $I_{LO} = 100 \mu\text{A}; I_{Hi} = 1 \text{ mA}$ | – | – | 0.2 | V |
| V_n | noise voltage density | $f = 1 \text{ kHz}; B = 1 \text{ kHz}; I_Z = 250 \mu\text{A}$ | – | – | 1.0 | $\frac{\mu\text{V}}{\sqrt{\text{Hz}}}$ |

THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|---------------|---|------------|-------|------|
| $R_{th j-tp}$ | thermal resistance from junction to tie-point | | 330 | K/W |
| $R_{th j-a}$ | thermal resistance from junction to ambient | note 1 | 500 | K/W |

Note

1. Device mounted on an FR4 printed circuit-board.

Low-voltage avalanche regulator diodes

PLVA600A series

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT23



Low-voltage avalanche regulator diodes

PLVA600A series

DEFINITIONS

| | |
|---|---|
| Data sheet status | |
| Objective specification | This data sheet contains target or goal specifications for product development. |
| Preliminary specification | This data sheet contains preliminary data; supplementary data may be published later. |
| Product specification | This data sheet contains final product specifications. |
| Limiting values | |
| Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability. | |
| Application information | |
| Where application information is given, it is advisory and does not form part of the specification. | |

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.

Low-voltage avalanche regulator diodes

PLVA600A series

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